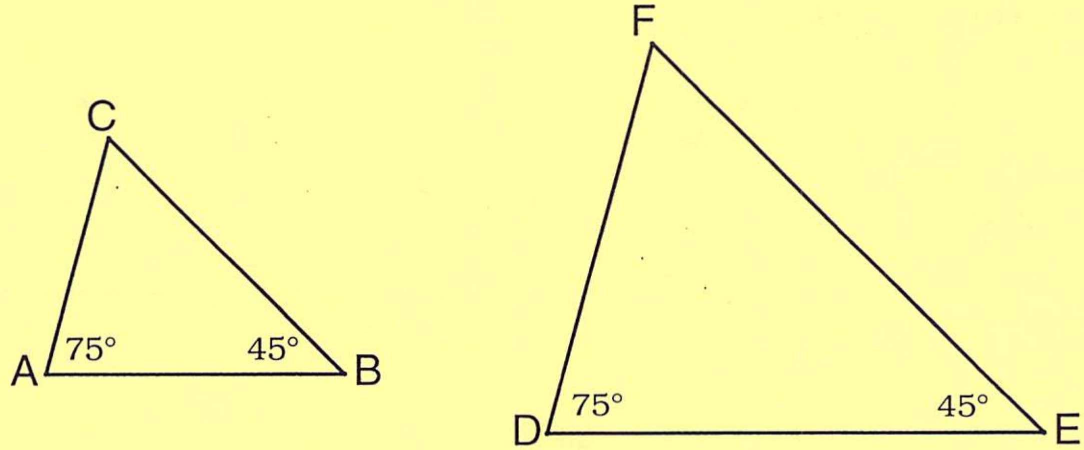
Block 4/5

7-3 Proving Similar Triangles



Using the diagram and measurements from the diagram on the screen, determine:

1. The ratio of the lengths of each pair of corresponding sides.

________________ ________________ ________________

2. $m\angle C$ = ________________ $m\angle F$ = ________________

3. Are the two triangles similar? YES or NO

4. **Complete this conjecture:**
   If two angles of one triangle are congruent to two angles of another triangle, then the triangles are ________________.

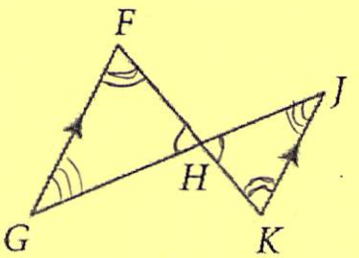
We have used 5 different theorems to prove triangles congruent. For proving triangles similar, there are only 3 theorems:

1. AA ~
2. SAS ~
3. SSS ~

Practice Problems:

Are the triangles are similar? If so, write a similarity statement for each pair and name the theorem you used.

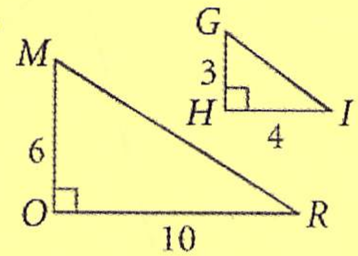
4.



AA~

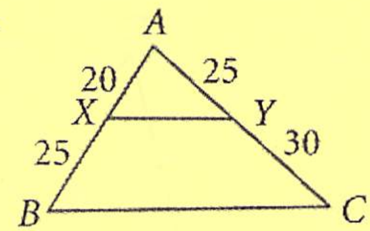
$\triangle GHF \sim \triangle JHK$

5.



NO!

6.



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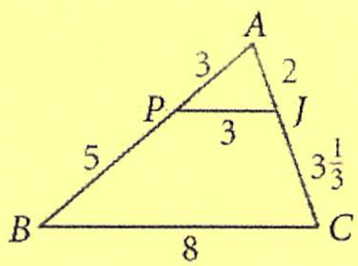
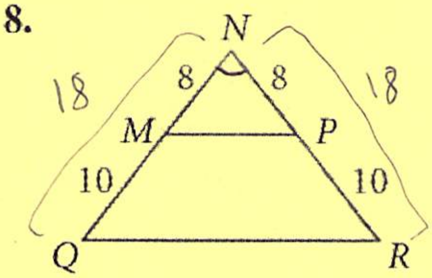


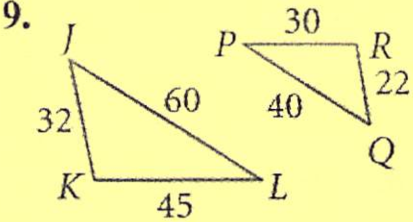
8.



SAS ~

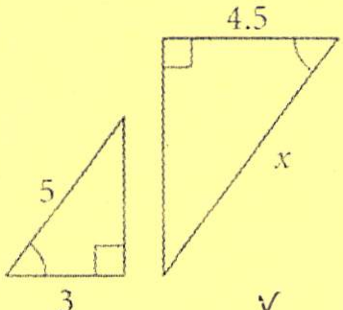
$\triangle MNP \sim \triangle QNR$

9.



Explain why the triangles are similar. Then find the value of *x*.

10.

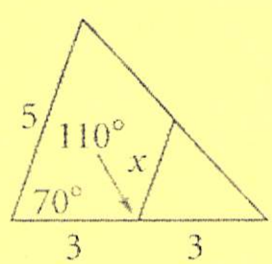


$\frac{x}{4.5} = \frac{5}{3}$

$3x = 22.5$

$\boxed{x = 7.5}$

11.



And now for your favorite part... Similar Triangle Proofs!!!

The PROVE statement for these proofs will be in the form of ONE of the following:

Prove: $\Delta ABC \sim \Delta EFG$ Prove: $\dfrac{AB}{EF} = \dfrac{AC}{EG}$ Prove: $(AB)(EG) = (EF)(AC)$

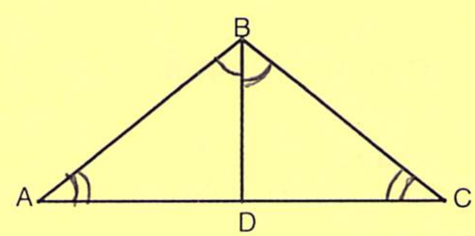
For these proofs, you will always start at the end and work backwards to find which triangles you will need to prove similar to each other. You will need to use one or more of the following steps, depending on which scenario you are asked to prove.

Statements	Reasons
Steps to Prove Triangles Similar :	
#. $\Delta ABC \sim \Delta EFG$	#. AA~
#. $\dfrac{AB}{EF} = \dfrac{AC}{EG}$	#. **Corresponding Sides of Similar Triangles are Proportional.**
#. $(AB)(EG) = (EF)(AC)$	#. **The Product of the Means is Equal to the Product of the Extremes.**

1. **Given**: Isosceles ΔABC

$\overline{BD}$ bisects $\angle B$

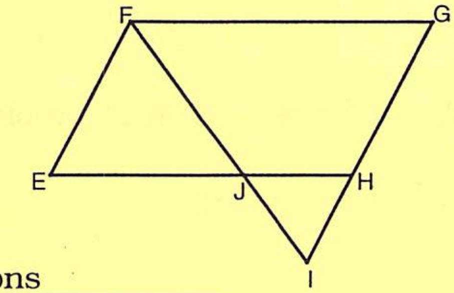
Prove: $\Delta ABD \sim \Delta CBD$



Statements	Reasons
① Isos ΔABC $\overline{BD}$ bisects $\angle B$	① Given
② $\angle ABD \cong \angle CBD$	② If an angle is bisected 2 $\cong$ $\angle$'s are formed
③ $\angle A \cong \angle C$	③ Base $\angle$'s of an isos Δ are $\cong$
④ $\Delta ABD \sim \Delta CBD$	④ AA~

2. **Given**: Parallelogram $EFGH$, $\overline{FJI}$, $\overline{EJH}$, $\overline{GHI}$

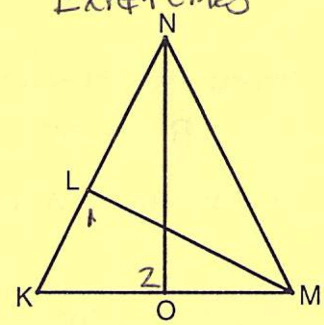
Prove: $(EF)(IJ) = (FJ)(HI)$



Statements	Reasons
(1) llogram EFGH $\overline{FJI}$, $\overline{EJH}$, $\overline{GHI}$	(1) Given
(2) $\angle FJE \cong \angle IJH$	(2) Vertical $\angle$'s are $\cong$
(3) $\overline{EF} \parallel \overline{GHI}$	(3) opp sides of llogram are $\parallel$
(4) $\angle FEJ \cong \angle IHJ$	(4) If $\parallel$ lines cut by transversal, alt int $\angle$'s are $\cong$
(5) $\triangle EFJ \sim \triangle HIJ$	(5) AA~
(6) $\frac{EF}{FJ} = \frac{HI}{IJ}$	(6) Corresp sides of ~ $\triangle$'s are in proportion
(7) $(EF)(IJ) = (FJ)(HI)$	(7) Product of Means = Product of Extremes

3. **Given**: $\overline{NO}$ and $\overline{ML}$ are altitudes

Prove: $\frac{OK}{LK} = \frac{NO}{ML}$



Statements	Reasons
(1) $\overline{NO}$ and $\overline{ML}$ are alt.	(1) Given
(2) $\overline{ML} \perp \overline{NK}$, $\overline{NO} \perp KM$	(2) If alt given then seg are $\perp$
(3) $\angle 1 \cong \angle 2$	(3) If $\perp$ seg then $\cong$ 90° $\angle$'s formed
(4) $\angle K \cong \angle K$	(4) Reflexive Prop
(5) $\triangle OKN \sim \triangle LKM$	(5) AA~
(6) $\frac{OK}{LK} = \frac{NO}{ML}$	(6) Corresponding sides of ~ $\triangle$'s are in proportion